



Industrial Wastewater Management Guide for **DAIRY INDUSTRIES**

Kampala Pollution Control Task Force



This Wastewater Management Guide provides facility owners, workers, lead agencies and others with practical information about mitigating water pollution from dairy processing facilities.

The objectives of the Guide are:



To provide dairy processing facilities with a reference tool for managing wastewater.



To help better understanding of the need for wastewater management and the associated benefits.



To provide key information on the existing institutional and legal framework as well as best practices for cleaner production and resource recovery and reuse optimization.

This Guide has been developed in close consultation with key stakeholders and, through review of relevant literature regarding industrial best practices and cleaner production. In addition, formal and informal technical discussions with members of the Kampala Pollution Control Task Force (PTF) have been used to generate expert opinion on wastewater management for the dairy processing industrial sub-sector.

The preparation of the Guide has been supported by the Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) Reform of the Urban Water and Sanitation Sector Programme (RUWASS) as well as the International Water Stewardship Programme (IWaSP), implemented by GIZ on behalf of German Development Cooperation and DFID.

Why wastewater management?

It's the law

Proper management of wastewater is required by law. Failure to comply with regulatory and legal requirements may lead to fines and/or other penalties.

(See page 10)

It's better for the environment

Toxic pollutants released in wastewater cause damage to the environment, affecting plant and animal life.

It's better for public health

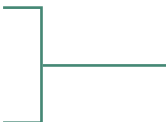
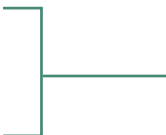
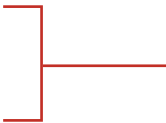
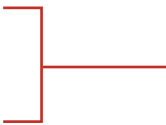
Toxic pollutants in wastewater contaminate surface water and ground water, and may end up in the food chain, exposing people to serious public health issues.

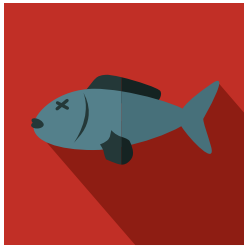
It makes financial sense

Water is a resource like any other, and therefore has an associated cost. The more water used, the higher the costs. By reducing the amount of water used, and by recovering and reusing water wherever possible, companies can save money and be more competitive.

In many cases pollutants in wastewater represent wasted raw materials. When properly handled, these can be recovered and reused leading to cleaner wastewater and cost savings on materials for companies.

Reducing the pollution load in water sent for treatment by NWSC will reduce the cost of treatment. This may in turn translate into reduced costs of water procured from NWSC.





When released into water sources, the organic load associated with dairy processing industries degrades using oxygen, reducing levels of dissolved oxygen in the water body. This may kill or drive away fish. The reduced fish catch in Lake Victoria's Murchison Bay may partly be attributed to high organic load pollution.



Almost all the surface and ground water in Kampala is polluted and the city's inhabitants are therefore exposed to serious health risks associated with water pollution. According to Ministry of Health and KCCA, last year's outbreak of typhoid was partly due to polluted surface and ground water.



Following a Cleaner Production Assessment and Training, GBK Dairy Products in Mbarara modified its production processes. These modifications resulted in a reduction of milk spillages and spoilt milk, leading to annual savings of about 15% for the company.



For example, since 2010, Leather Industries of Uganda's investment in cleaner production to prevent pollution and reduce resource consumption has led to a savings of \$2.2m (about UGX7.5b) against investment of \$1.7m (about UGX5.6b), which represents a healthy return of 130% over six years.

What to avoid

CONTAINERS NOT CLEANED PROPERLY

Dairy products get spoilt due to bacteria in dirty containers

→ **Product wastage and additional cleaning required**

IMPROPER DISPOSAL OF SPOILT DAIRY PRODUCTS

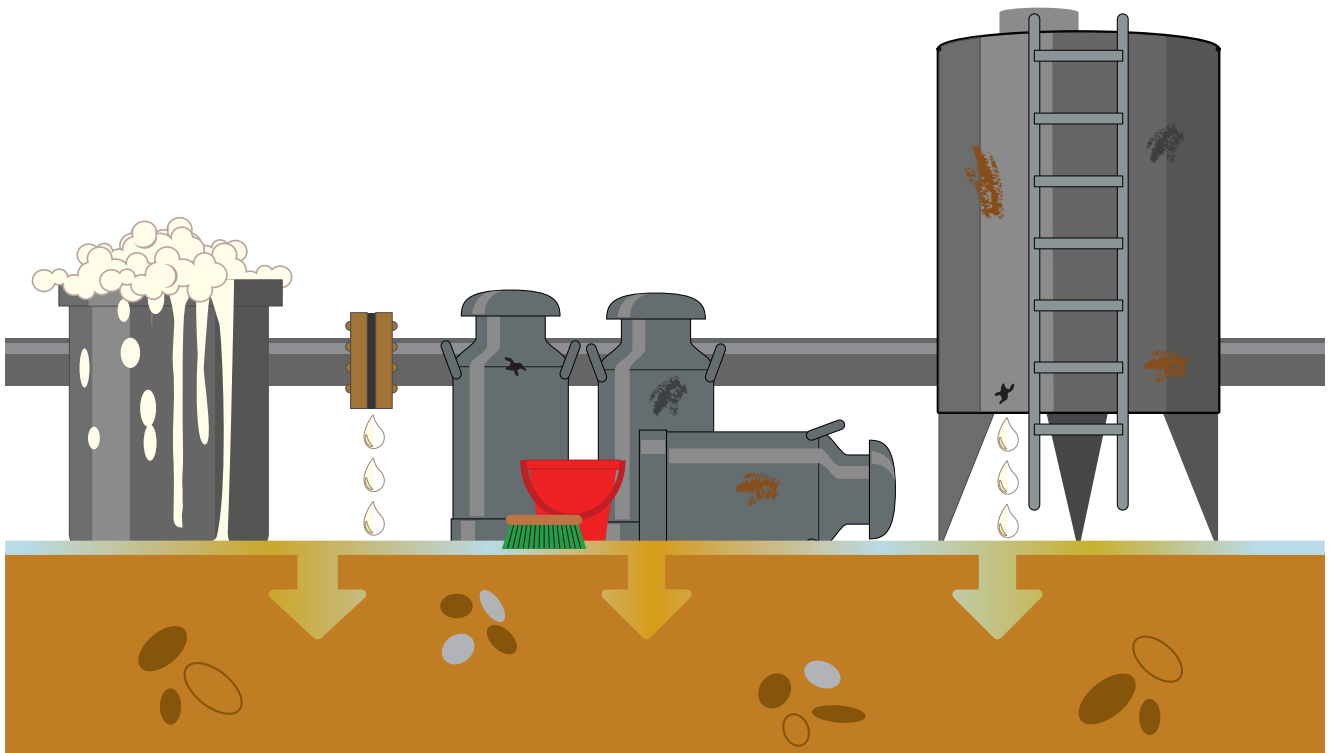
Wastage and organic load in environment

→ **Pollution & environmental damage**

MILK PRODUCTS NOT TESTED ON ARRIVAL

Spoiled milk may be mixed with good milk and ruin an entire batch.

→ **Product wastage and additional cleaning required**



LACK OF AUTOMATION

Manual systems create more spillages and waste requiring additional cleanup

→ **More wastewater generated**

LACK OF MAINTENANCE

More leakages and wastage

→ **More organic load in wastewater**

IMPROPER CLEANING METHODS

Manual cleaning using basic equipment

→ **More water and cleaning agents used**

GROUND COVER NOT IMPERMEABLE

Organic load mixes with water and seeps into the groundwater

→ **Pollution & public health issues**

EFFECTIVE WASTEWATER MANAGEMENT RELIES ON A TWO-STAGE APPROACH

1 Reducing the amount of wastewater generated

Making processes more efficient and reusing water wherever possible will lead to an overall reduction in the amount of wastewater generated.

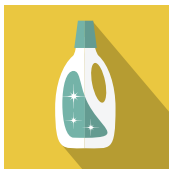
2 Ensuring wastewater is as clean as possible

Ensuring end-of-pipe wastewater is properly treated and meets effluent discharge standards will lead to a reduction in toxins entering the environment.

1 STEPS TO REDUCE WASTEWATER GENERATION



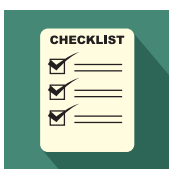
Use pre-clean and dry cleanup methods before wet cleaning. This reduces the volume of water used and the volume of wastewater generated.



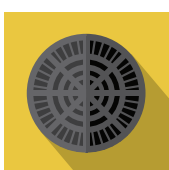
Use the minimum amount of cleaning agents and detergents. This saves on the costs of cleaning agents in addition to minimizing the amount of cleaning agent pollution in wastewater.



Avoid use of wastewater streams as a transport medium. Transfer solids and particulate matter by mechanical means.

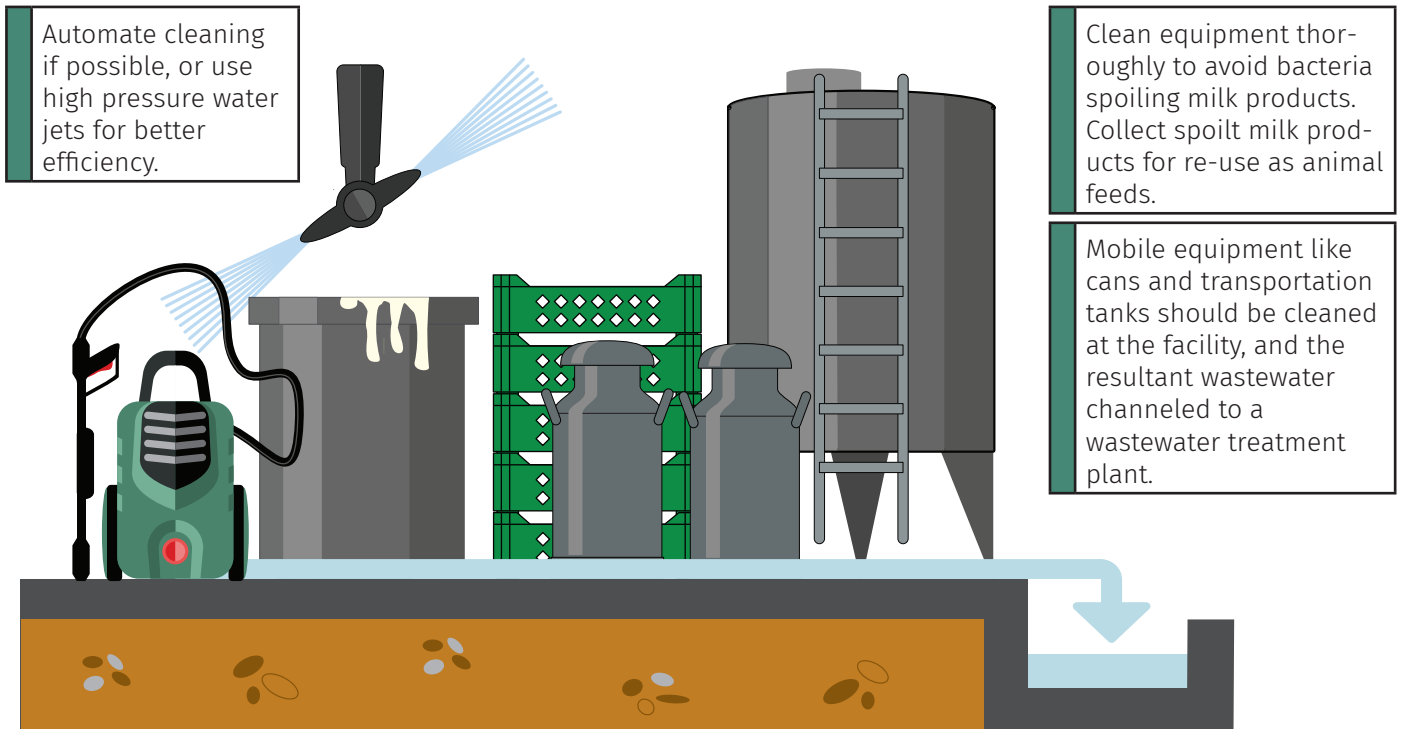


Ensure employees are trained and aware of how to minimize water usage and wastewater generation.



Fit drains with screen and/or traps to prevent solid materials from entering the effluent system.

2 | BEST PRACTICE AND WASTEWATER TREATMENT

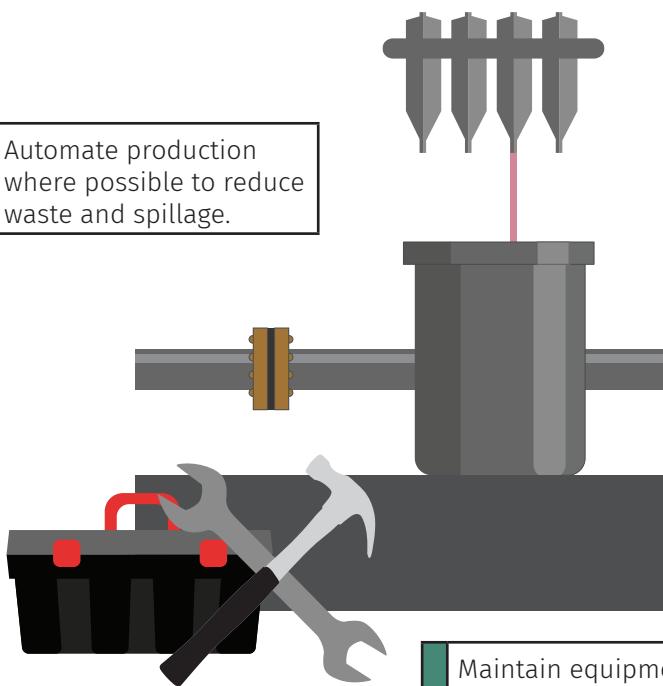


The work area should have an impermeable ground cover, preferably concrete, to retain any leakage.

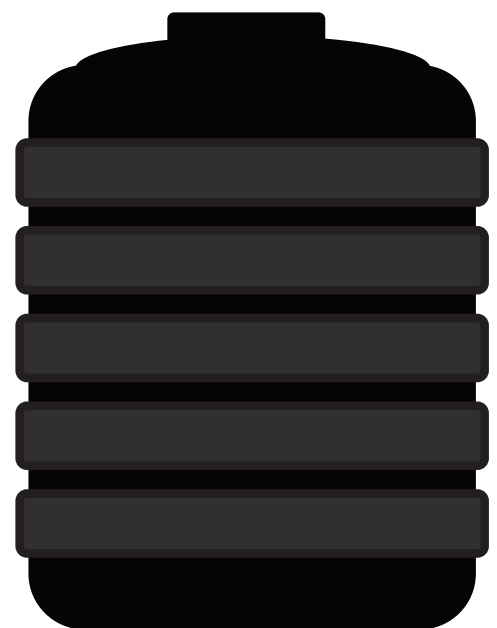
Optimize chemical use and ensure all water from washing and cleaning is directed to a collecting container.



Automate production where possible to reduce waste and spillage.



Maintain equipment and installations regularly to ensure efficient running.

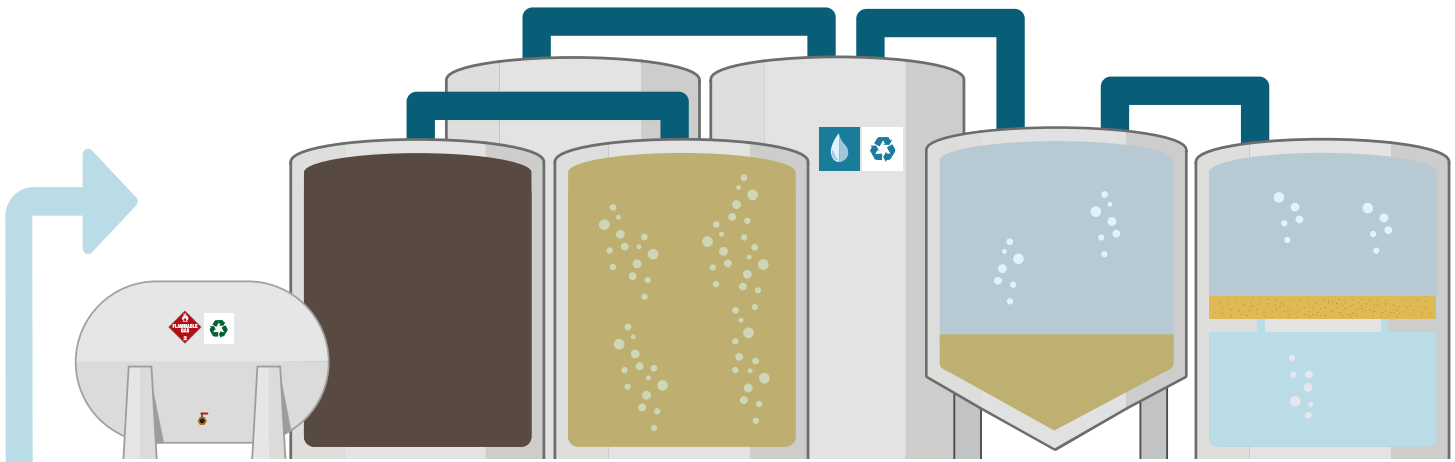


All collected wastewater should be sent to the treatment plant for treatment prior to reuse or discharge.

EVERY DAIRY PROCESSING FACILITY SHOULD HAVE AN EFFLUENT TREATMENT PLANT

Treat all wastewater leaving the facility, including water collected after washing and cleaning.

Small and affordable effluent treatment plants can be assembled using locally available equipment. 



BIOGAS PRODUCTION
Biodegradation of organic load from dairy produces methane which can be captured.

1 ANAEROBIC TREATMENT
Micro-organisms break down biodegradable materials.

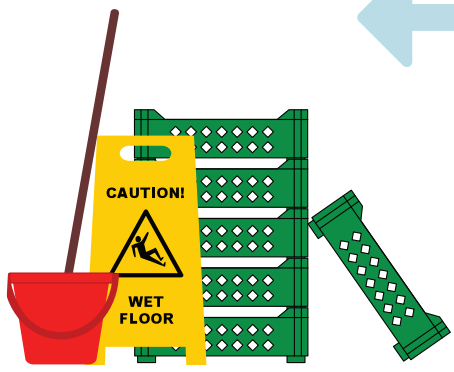
2 AERATION
Stimulates biodegradation of pollutant components.

3 SEDIMENTATION
Removes suspended solids from wastewater.

4 DISINFECTION & FILTRATION
Removes any remaining bacteria from water making it ready for reuse or discharge.



Sludge removed from treatment plants can be dried and used/sold as fertilizer.



Treated wastewater that has been disinfected and filtered can be reused for cleaning floors and washing crates. Reduce water usage to save money.



Regularly monitor treated water being discharged for pH, biological oxygen demand and chemical oxygen demand.

Wastewater regulations

Dairy processing firms should be aware of and comply with the following basic legal requirements for the operations with a special focus on waste and wastewater.

Permit/License/Certificate	Law/Regulations	Fee (UGX)	
EIA Certificate of Approval (for new, expansions or refurbishments)	<ul style="list-style-type: none"> National Environment Act Cap 153 National Environment (Impact Assessment) Regulations, 1998 	If project/business cost is:	
		<50M	250,000
		50M-100M	500,000
		100M-250M	750,000
		250M-500M	1,000,000
		500M-1B	1,250,000
		1B -5B	2,000,000
		>5B	0.1% of the project cost
		Note: The developer also incurs costs for consultant who carries out an EIA	
Pollution License (for activities polluting the environment in excess of standards)	<ul style="list-style-type: none"> National Environment Act Cap 153 	Determined in accordance with Polluter Pays Principle	
License to Own and Operate a Wastewater Treatment and Disposal Plant	<ul style="list-style-type: none"> National Environment (Waste) Management Regulations, 1999 	Application fee	50,000
		License fee	300,000
Wastewater Discharge Permit	<ul style="list-style-type: none"> The Water Act, Cap 152 The Water (Waste Discharge) Regulations SI 152-1 	Permit processing fees	650,000
		Annual discharge fees	depend on volume and the biological and physiochemical quality of waste
		The charges range from 500,000 to 13,000,000 and are calculated based on the criteria set out in the regulations	
License for Waste Storage	<ul style="list-style-type: none"> National Environment (Waste) Management Regulations, 1999 	Application fee	50,000
		License fee	200,000
License to Transport Waste (this can be outsourced to licensed waste transporters)	<ul style="list-style-type: none"> National Environment (Waste) Management Regulations, 1999 Basel Convention on Trans-boundary movement of wastes, in case the batteries are imported 	Application fee	50,000
		License fee	100,000
		Note: If transportation is outsourced, the cost depends on negotiation with the transporter	
Suitability of Premises Certificate - Medical Examination (required for Suitability of Premises Certificate)	<ul style="list-style-type: none"> Public Health Act Public Health Act 	Fee	200,000
		Fee	20,000 per person
Approval for Discharge into NWSC Sewerlines	<ul style="list-style-type: none"> National Water and Sewerage Corporation Act, 1995 	80% of water bill If not NWSC customer, water consumption is estimated	

Issuing Authority	How to Apply	Validity
National Environment Management Authority (NEMA)	Carry out an EIA (EIA conducted by certified EIA practitioners) Submit to NEMA for consideration	Has no validity period but it is subject to implementation of the project starting within five (5) years from the date of issuing an EIA certificate of approval
Pollution Licensing Committee (PLC) - NEMA	Apply to PLC through NEMA as a secretariat with documents indicating the characteristics and quantity of wastewater that will be discharged	Validity period – determined by the discharge i.e. how long will the facility require before rectifying the problem
Pollution Licensing Committee (PLC) - NEMA	Carry out an EIA and obtain an EIA Certificate of Approval Apply to PLC through NEMA as a secretariat and attach the plant designs	One (1) year
Directorate of Water Resources Management (DWRM) - Ministry of Water and Environment (MWE)	Install a wastewater treatment plant Start operations, and then: apply to Director, DWRM	Permit duration between one (1) year and three (3) years
Pollution Licensing Committee (PLC) – NEMA	Apply to PLC through NEMA as a secretariat	One (1) year
Pollution Licensing Committee (PLC) - NEMA	Apply to PLC through NEMA as a secretariat	One (1) year
Kampala Capital City Authority (KCCA)	Apply to KCCA for certification KCCA inspects and makes a decision	One (1) calendar year
Kampala Capital City Authority (KCCA)	KCCA examines and makes a decision	6 months
National Water and Sewerage Corporation (NWSC)	Must first pre-treat wastewater to meet standards for discharge into sewer lines, apply for approval from sewerage department or water quality management department, NWSC for connection	Open

Periodic checks

Periodic checks and audits form an important part of a strategy to identify inefficient use of resources, inadequate management of waste, and opportunities for improvement. Increasing the efficiency of the utilization of resources, and reducing and avoiding the generation of pollutants is integral in protecting and improving the environment, ensuring the health of human beings, promoting sustainable development, and generating economic benefits to businesses.

Below is a summary of periodic checks that may be applicable for dairy processing industries.

MANDATORY CHECKS

Type	Responsible institution	Frequency	Fees	Procedure
Compliance Environmental Audit	National Environmental Management Authority (NEMA)	Annual	No NEMA fees, only the Environmental Auditor needs to be paid	Engage a NEMA certified Environmental Auditor. (List available from NEMA)

RECOMMENDED CHECKS

Type	Responsible institution	Frequency	Fees	Procedure
Adoption of Cleaner Production Practices	Uganda Cleaner Production Centre (UCPC)	As and when required	UCPC fees depend on the size of the enterprise Small - up to \$2600 Medium - up to \$3800 Large - up to \$6600	Contact UCPC for more information
Self-Internal Audits	Firm/NEMA	As and when required	Environmental Auditor fees - depend on the magnitude of work	Engage a NEMA certified Environmental Auditor. (List available from NEMA)

National Environment Management Authority (NEMA)

Website: www.nemaug.org
Email: info@nemaug.org
Tel: +256 414 251068

Directorate of Water Resources Management (DWRM) - Ministry of Water and Environment (MWE)

Website: www.mwe.go.ug
Tel: +256 414 505942

Kampala Capital City Authority (KCCA)

Website: www.kcca.go.ug
Email: info@kcca.go.ug
Tel: +256 204 660800

National Water and Sewerage Corporation (NWSC)

Website: www.nwsc.co.ug
Email: info@nwsc.co.ug
Tel: +256-313 315 100/312-260 414/5

Uganda Cleaner Production Centre (UCPC)

Website: www.ucpc.co.ug
Email: ucpc@ucpc.co.ug
Tel: +256 414 287938

Licensed Waste Handlers

A full list of licensed waste handlers is available from NEMA. It can be downloaded from the NEMA website by going to <http://nema.go.ug/index.php/enviromental-mgt-complaine/waste-handlers> and clicking on “Click here to download full document”.

For further information or enquiries call the NEMA Hotline on any of the following numbers:

+256 414 251064

+256 414 251065

+256 414 251068

Kampala Pollution Control Task Force

The Kampala Pollution Control Task Force (PTF) was formed with support from the GIZ RUWASS Programme. It comprises of Kampala Capital City Authority (KCCA), the Ministry of Water and Environment's Directorate of Water Resource Management (DWRM), the National Environmental Management Authority (NEMA), and National Water and Sewerage Corporation (NWSC). Uganda Manufacturers Association (UMA) and Uganda Cleaner Production Centre (UCPC) were also brought on board to enhance the engagement of the industrial sector through a Public-Private Dialogue (PPD) regarding Cleaner Production and improved resource recovery and reuse efficiency, with a focus on water, waste and energy optimization.

Key priorities of the task force include the following:

- **Information exchange and collaboration among key government institutions including: DWRM, KCCA, NEMA, NWSC to jointly engage the public and private sector about legal provisions and regulations on wastewater discharge and pollution control.**
- **Launch campaigns to enhance compliance to DWRM/NEMA permit regulations regarding wastewater discharge.**
- **Conduct joint industrial assessments and disseminate pollution monitoring information to the public and private sector.**
- **Engage potential priority polluters and the private sector in general in a dialogue with the public sector through the Kampala Public – Private Wastewater Dialogue on wastewater management and pollution control to increase awareness and trust.**

For more information please visit the PTF webpage at:

<http://www.kcca.go.ug/pollution-control-task-force>

Also available in this series are Industrial Wastewater Management Guides
for the following industries:

Battery Recycling Industries
Paint Industries
Soft Drink Industries
Textile Industries
Garages
Abattoirs
Steel Rolling Mills

